

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
Attorney Docket No. 13940US02 (BU 2546.1)

IN THE APPLICATION OF:

Scott S. McDaniel

SERIAL NO.: 10/643,331

FILED: August 19, 2003

FOR: A SYSTEM AND METHOD FOR  
TRANSFERRING DATA OVER A  
REMOTE DIRECT MEMORY ACCESS  
(RDMA) NETWORK

EXAMINER: BELANI, KISHIN G

GROUP ART UNIT: 2443

CONFIRMATION NO.: 3987

CUSTOMER NO.: 23446

Electronically Filed on July 19, 2010

**PRE APPEAL BRIEF REQUEST FOR REVIEW**

Mail Stop AF  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

The Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reasons stated on the attached sheets.

Respectfully submitted,

Date: July 19, 2010

By: /Philip Henry Sheridan/  
Philip Henry Sheridan  
Reg. No. 59,918  
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**REMARKS**

The present application includes pending claims 1-25, all of which have been rejected. The Applicant respectfully submits that the claims define patentable subject matter.

Claims 1-5, 10 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Osborne (U.S. Patent No. 5,790,804). Claims 6-9, 11-15 and 17-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over various combinations of Osborne, Roach et al. (U.S. Patent No. 6,304,910, hereinafter “Roach”), Tillier (U.S. Patent No. 6,421,742), Pandya (U.S. Patent No. 7,376,755), and Futral et al. (U.S. Patent No. 5,991,797, hereinafter “Futral”). The Applicant respectfully traverses the rejection for at least the following reasons.

Regarding claim 1, the Applicant respectfully submits that Osborne fails to at least teach, suggest, or disclose, for example, “wherein a **one-shot initiation process** of an RDMA operation is **performed between the driver and the NIC** of the host, **the one-shot initiation process comprising communicating a single command message comprising: buffer command information, and a write command to write a send command,**” as set forth in Applicant’s independent claim 1.

Regarding claim 17, Applicant respectfully submits that the combination of Osborne and Pandya at least fails to teach, suggest, or disclose at least, for example, “wherein a **one-shot completion process** of an RDMA operation is **performed between the driver and the NIC** of the host, **the one-shot completion process comprising communicating a single completion message comprising: a send complete indication, and buffer freeing status information,**” as set forth in Applicant’s independent claim 17.

Regarding claim 24, Applicant respectfully submits that the combination of Osborne and Roach at least fails to teach, suggest, or disclose at least, for example, “initiating an RDMA write operation using a **one-shot initiation process between a driver and a NIC** of a host, wherein **the one-shot initiation process comprises communicating a single command message comprising: buffer command information comprising commands to insert and validate an**

**S**Tag value, and a write command to write an RDMA send message,” as set forth in Applicant’s independent claim 24.

Regarding claim 25, Applicant respectfully submits that the combination of Osborne, Pandya and Roach at least fails to teach, suggest, or disclose at least, for example, “completing an RDMA write operation using a **one-shot completion process between a NIC and a driver** of a host, wherein **the one-shot completion process comprises communicating a single completion message comprising: a send complete indication, buffer freeing status information, and an S**Tag value,” as set forth in Applicant’s independent claim 25.

In prior art systems, in performing an initiation process of an RDMA operation, **multiple buffer command messages** (e.g., command to register pinned down memory buffers into a region, binding a portion of the pinned buffer to an STag value, etc.) are sent from a driver of a host to a NIC of a host.<sup>1</sup> Additionally, a write command instructing the NIC to write a second command is sent from a driver of a host to a NIC of a host.<sup>2</sup> The prior art completion process of an RDMA includes **multiple completion status and completion command messages** (e.g., completion message with STag, unbind STag command, unbind completed message, unpin region command, unpin completed message, etc.) sent between a driver of a host and a NIC of a host.<sup>3</sup> In contrast to the prior art, Applicant’s claims are directed towards a **one-shot** initiation process (independent claims 1 and 24) or a **one-shot** completion process (independent claims 17 and 25).

First, the Applicant notes that the cited references do not even describe the initiation process of an RDMA operation being performed between the driver and the NIC of the host. In the May 26, 2010 Applicant-initiated Examiner interview, the Examiner argued that an initiation process must occur and does not explicitly need to be disclosed because it is obvious (despite the rejection of independent claim 1 being under 35 U.S.C. 102(b)). However, as noted by the Applicant’s representative in the interview, although an initiation process may occur in Osborne,

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<sup>1</sup> See e.g., Applicant’s Prior Art Figure 3 (270, 290) and Applicant’s Specification, Paragraph [12].

<sup>2</sup> See e.g., Applicant’s Prior Art Figure 3 (310) and Applicant’s Specification, Paragraph [12].

<sup>3</sup> See e.g., Applicant’s Prior Art Figure 3 (420-460) and Paragraph [14].

the reference itself does not disclose the details of the initiation process and thus cannot disclose the Applicant's one-shot initiation process set forth in independent claims 1 and 24.

For example, the Office Action alleges that Osborne teaches the Applicant's claim limitations by Osborne's disclosure at Figures 1-2 and the supporting disclosure.<sup>4</sup> However, Osborne's Figures 1-2 and the supporting disclosure merely teach that an application 58 of sender 50 sends an operating system 56 of sender 50 a send command including a receiver ID, a source address of the message data to be sent, and a size of the data to be sent. Next, Osborne teaches that in response to the received send command, operating system 56 of sender 50 copies the message data to be sent from application memory 66 to operating system message buffers 62. Alternatively, instead of copying the message data, operating system 56 of sender 50 may map locations in application memory 66 to message buffers 62. Then, Osborne teaches that its operating system 56 performs protocol processing if necessary. Subsequently, the message is sent over a network using network interface 84.<sup>5</sup>

The Office Action alleges that Osborne's processor 54 of sender 50 is the driver and Osborne's network interface 84 of sender 50 is the NIC.<sup>6</sup> However, nowhere in Osborne is there any explicit disclosure regarding anything being sent between Osborne's processor 54 and network interface 84, let alone that a one-shot initiation process of an RDMA operation is performed between driver and NIC of the host by communicating a single command message comprising: buffer command information, and a write command to write a send command. Regarding Osborne's send command, the Applicant notes that Osborne's send command does not contain any buffer command information.<sup>7</sup> Additionally, Osborne's send command is merely used by the operating system 56 to copy the message data to be sent from application memory 66 to operating system message buffers 62.<sup>8</sup> Nowhere in Osborne is there any disclosure regarding the send command being sent from processor 54 to network interface 84. Put another way, it is

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<sup>4</sup> Office Action, Pages 2-4, 11-14 and 27-29.

<sup>5</sup> See e.g., Osborne, Figures 1-2 and Column 7, Lines 14-36).

<sup>6</sup> Office Action, Page 3, Line 3-6 and Page 12, Lines 2-4.

<sup>7</sup> Osborne, Column 7, Lines 22-25.

<sup>8</sup> Osborne, Figure 1 (67), Figure 2 (99, 100), Column 7, Lines 18-31.

the message data copied/mapped from the application memory 66 to operating system message buffers 62 that is sent over network 82 via network interface 84, not the send command 67 sent between application 58 and operating system 56. As such, even if Osborne's send command could be considered Applicant's single command (which it clearly is not), the Applicant notes that Osborne's send command is not sent between a driver and a NIC of a host, but is instead sent between an application and an operating system.<sup>9</sup>

Because Osborne merely teaches communicating a message from a sender 50 to a receiver 52 without disclosing any initiation process of an RDMA operation performed between the driver and the NIC of the host, let alone a one-shot initiation process, the Applicant notes that the cited reference clearly fails to teach the Applicant's claim limitations. Pandya, Roach, Tillier and Futral fail to remedy the deficiencies of Osborne. As such, the Applicant respectfully submits that the Office Action's allegation that the cited references teach the one-shot initiation process of Applicant's independent claims 1 and 24, amounts to **clear error**.

Second, the Applicant notes that the cited references do not describe the completion process of an RDMA operation being performed between the driver and the NIC of the host. In the May 26, 2010 Applicant-initiated Examiner interview, the Examiner acknowledged that the cited references failed to teach a single completion message sent between the driver and the NIC of the host comprising buffer freeing status information. Rather, the Examiner acknowledged that the sections of the Pandya reference cited by the Examiner merely disclose a message indicating the data transfer is complete is sent from the target to the initiator and that the completion message is passed up to the host SCSI layer where the message is processed and the buffers being used are released.<sup>10</sup> However, the Examiner indicated that a NIC would not pass buffer freeing status information to the driver with the send complete indication (as recited in independent claims 17 and 25) because the NIC cannot free buffers. In other words, despite acknowledging that the cited references failed to teach the claim limitations, the Examiner argued that the claims were not allowable because they were allegedly inoperable.

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<sup>9</sup> Osborne, Figure 1 (67), Figure 2 (99, 100), Column 7, Lines 18-31.

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Because Pandya merely teaches communicating a message indicating that the communication session is complete up to an SCSI layer, which releases the buffers used for the data transfer, Pandya fails to remedy the deficiencies of Osborne in that the combination of references clearly fails to disclose a one-shot completion process of an RDMA operation being performed between the driver and the NIC of the host, the one-shot completion process comprising communicating a single completion message comprising: a send complete indication, and buffer freeing status information. Roach, Tillier and Futral fail to remedy the deficiencies of Osborne and Pandya. As such, the Applicant respectfully submits that the Office Action's allegation that the cited references teach the one-shot completion process of Applicant's independent claims 17 and 25, amounts to **clear error**.

The Applicant further notes that dependent claims 2-16 and 18-23 depend from independent claims 1 and 17, respectively, and are therefore allowable for at least the reasons set forth above with regard to independent claims 1 and 17, respectively. The Applicant further notes that each of dependent claims 2-16 and 18-23 is independently allowable.

Thus, Applicant respectfully submits that claims 1-25 of the present application should be in condition for allowance at least for the reasons discussed above and request that the outstanding rejections be reconsidered and withdrawn. The Commissioner is authorized to charge any necessary fees or credit any overpayment to the Deposit Account of McAndrews, Held & Malloy, Account No. 13-0017.

Respectfully submitted,

Date: July 19, 2010

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<sup>10</sup> Pandya, Figure 33 (step 3310) and Column 13, Lines 35-48.